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3,773,739

BASIC POLYAMIDES AND PROCESS FOR THEIR PREPARATION

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No Drawing. Original application Sept. 29, 1970, Ser. No. 76,646, now Patent No. 3,668,278. Divided and this application Apr. 28, 1972, Ser. No. 248,630

Claims priority, application Italy, Oct. 1, 1969, 22,766/69; Oct. 2, 1969, 22,830/69

Int. Cl. C08g 20/20

U.S. Cl. 260—78 A

6 Claims

ABSTRACT OF THE DISCLOSURE

A new class of basic polyamides having a molecular weight between about 2000 and 200,000. The polyamides are prepared by first reacting an acrylic or methacrylic ester with a monoamine and then further reacting the obtained product with a polyamine. The polyamides are suitable for use as tinctorial modifiers for polymeric materials and particularly for crystalline polyolefins consisting essentially of isotactic macromolecules.

CROSS-REFERENCES TO RELATED APPLICATION

This application is a division of our copending application Ser. No. 76,646, filed Sept. 29, 1970, now U.S. Pat. No. 3,668,278, the contents of which are hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

(1) Field of the invention

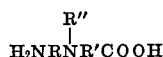
This invention relates to basic polyamides. More particularly, this invention concerns basic polyamides that are condensation products of acrylic or methacrylic esters with both a monoamine and a polyamine.

(2) Description of the prior art

Basic polyamides obtained by the polycondensation of isocinchomeric acid with diamines are described in U.S. Pat. No. 3,320,334. The polycondensation of an N,N'-bis (ω-carboalkoxyalkyl)piperazine with a diamine is described in U.S. Pat. No. 3,331,888. In addition, the reaction of an acrylic or methacrylic ester with one or more polyamines is well known.

Also, in a series of articles in "Chimica e Industria" (March 1967, page 271; May 1967, page 453; June 1967, page 587; August 1967, page 826), a number of basic polyamides obtained by polycondensation of various dicarboxylic derivatives with different amines are described.

U.S. Pat. 3,445,441 discloses a group of amino-amido polymers which are the reaction products of a polyamine and an acrylate type compound. Such polymers are used to break oil-in-water emulsions, inhibit corrosion and clarify water. Also discloses polyamides which can be formed into fibers but are particularly suitable as curable wet strength adhesives, which polyamide resins are prepared by reacting an acrylic ester and an amine in a polar medium at a temperature of 30° C. or below. An earlier Canadian patent, No. 435,450, discloses the production of polyamides by the reaction of diamines with dicarboxylic acids or amide forming derivatives thereof having a tertiary amino nitrogen. Alternatively, tertiary nitrogen-containing amino acids of the formula



can be employed.

SUMMARY OF THE INVENTION

We have discovered a new class of basic polyamides and an economical process for the preparation thereof. The

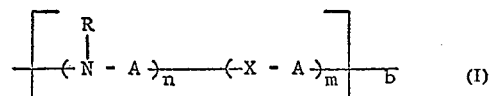
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polyamides of the present invention are suitable for use as tinctorial modifiers for polymers, particularly olefinic polymers; they render such polymers particularly receptive to dyes of the acid, metallized and plastosoluble classes. Additionally, we have found that the basic polyamides of the present invention, when incorporated into crystalline polyolefins consisting essentially of isotactic macromolecules, substantially improve workability of such mixes in the granulating, extrusion, stretching and textile finishing operations.

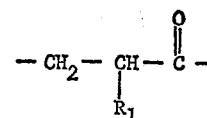
As described more fully in our application Ser. No. 76,646, now U.S. Pat. No. 3,668,278 the polyamides of the present invention are also suitable tinctorial modifiers for fibrogenous polymers other than olefin polymers, such as, for example, acrylic polymers, e.g., polyacrylonitrile, vinyl polymers, e.g., polyvinyl chloride, polyesters, polyamides and the like.

The polyamides of the present invention may be prepared by reacting a monoamine with an ester of acrylic or methacrylic acid and further reacting the product thereby obtained with a polyamine. Preferably, the polyamides of the present invention have molecular weights in the range of from about 2000 to 200,000.

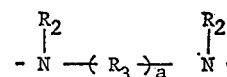
The basic polyamides of the present invention have the formula:



wherein n and m are integers from 1 to 99; b is an integer; N is nitrogen; R is an aliphatic radical, cycloaliphatic radical or aromatic radical selected from the group consisting of radicals of the phenyl and naphthyl series, which radicals contain up to 30 carbon atoms; A is



wherein R_1 is hydrogen or a lower alkyl radical; X is



wherein R_2 is hydrogen or a lower alkyl radical, R_3 is a methylene radical, an arylene radical selected from the group consisting of radicals of the phenylene series, or lower alkylenearylene radical wherein the arylene portion is selected from the group consisting of radicals of the phenylene series, and a is an integer from 1 to 10; with the proviso that when a is 1, R_3 may also be



wherein each of the two R_4 groups may be the same or different and each R_4 is lower alkylene radical or



wherein each R_5 is $-\text{CH}_2-$ or $-\text{C}_2\text{H}_4-$ and z is an integer from 1 to 5; or R_3 may be a heterocyclic bivalent residue which may contain heteroatoms selected from the group consisting of nitrogen in the form of secondary or